



Department of Energy

Transportation Fuel Cell R&D

Merit Review and Peer Evaluation

National Laboratory R&D

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Office of Energy Efficiency and Renewable Energy
(EERE)

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Presentation Outline

- *New EERE Organization*
- *FreedomCAR*
- *Fuel Cell and Hydrogen R&D Activities*
- *Purpose of Meeting*



National Energy Policy

Directs the Secretary Of Energy “to develop next generation technology including hydrogen...

“Focus research and development efforts on integrating current programs regarding hydrogen, fuel cells, and distribution...

Develop legislation to provide for a temporary income tax credit available for the purchase of new hybrid or fuel cell vehicles.”



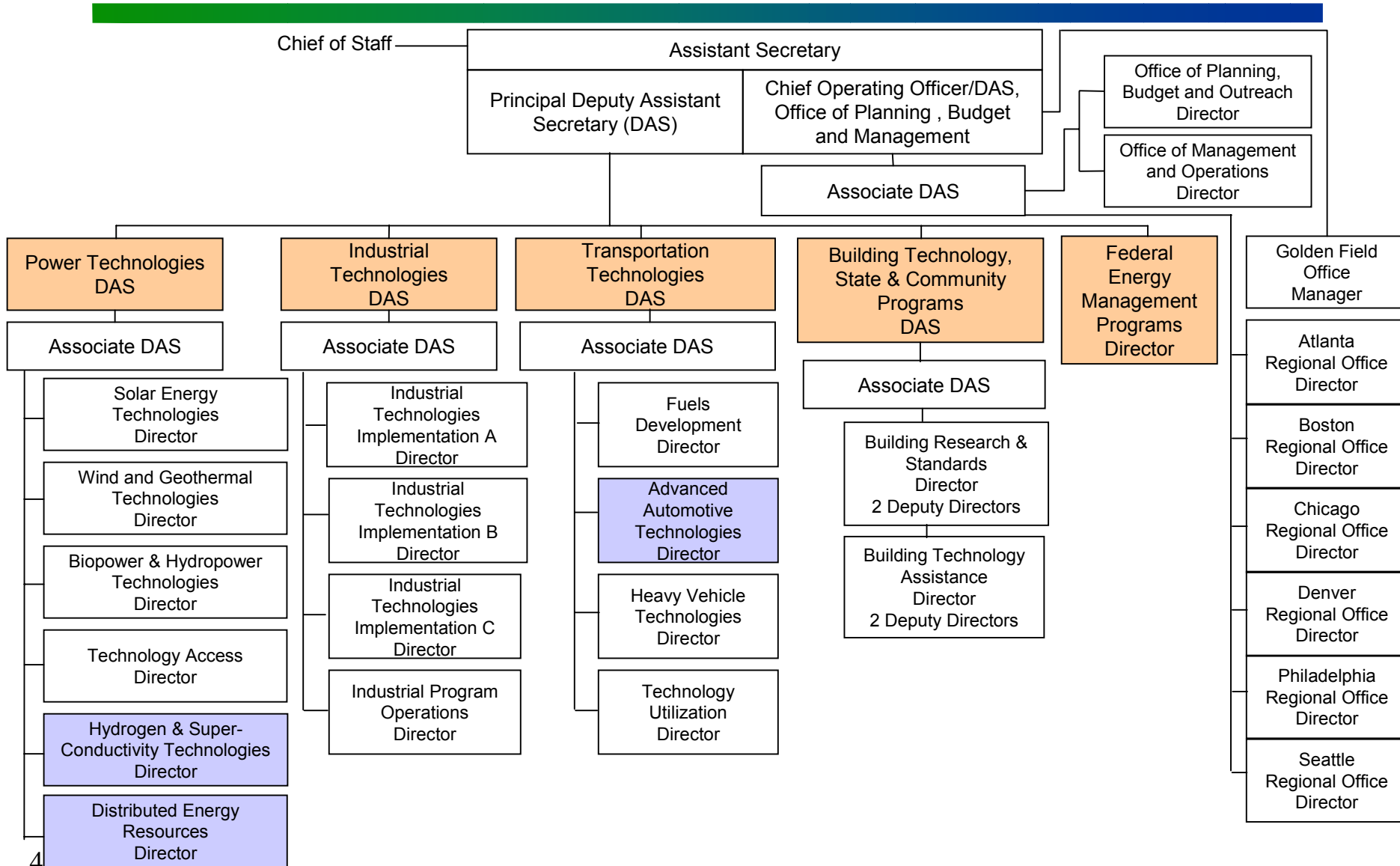
“The President’s Plan directs us to explore the possibility of a hydrogen economy....”

Spencer Abraham, Secretary of Energy



The Current “Market Sector” Model

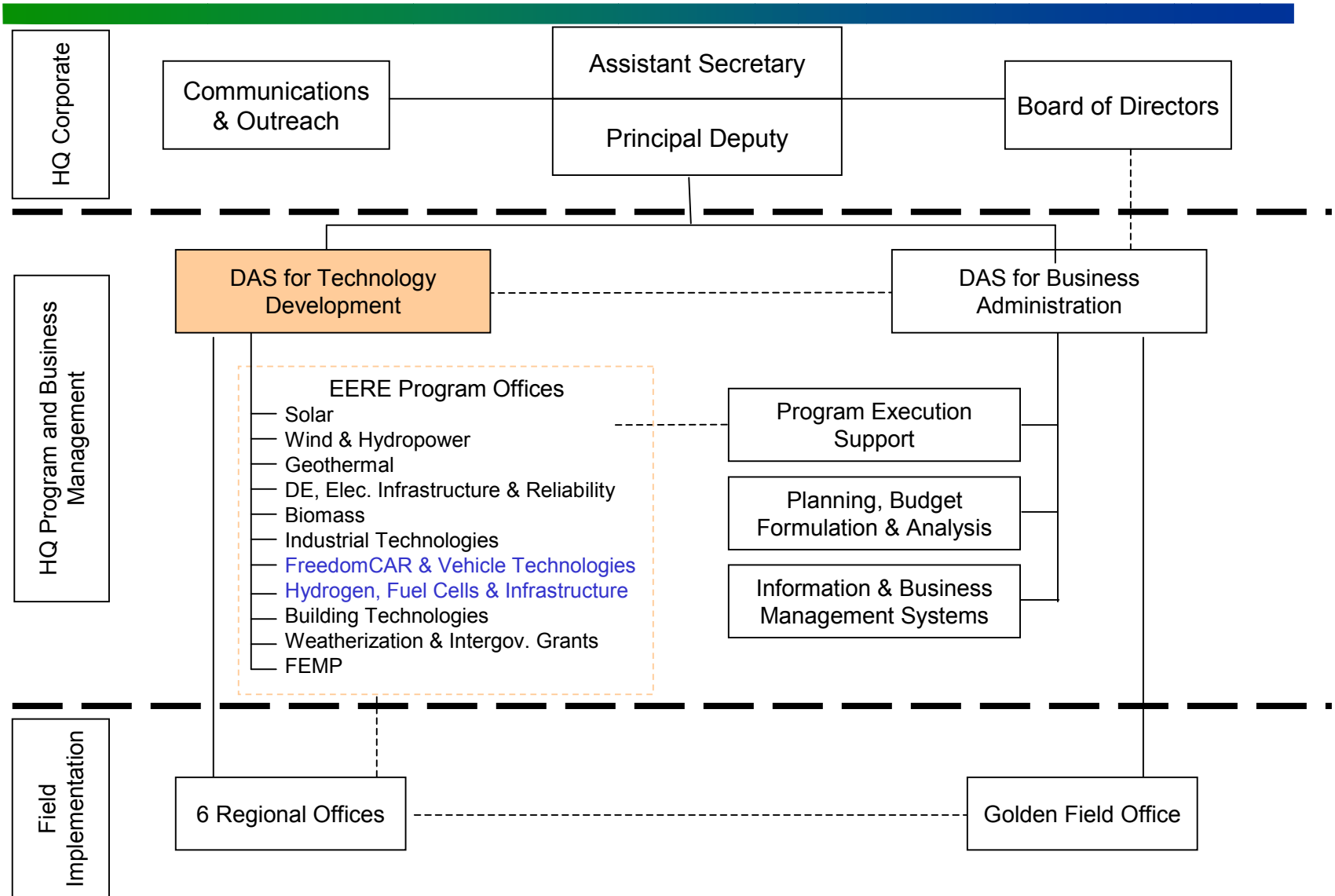
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A New Streamlined, Integrated, and Focused Model

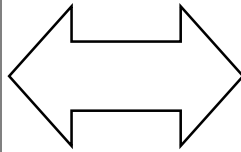
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DOE Fuel Cell Related Programs

**Office of
Energy Efficiency
and Renewable Energy
(EERE)**



**Office of
Fossil Energy
(FE)**

Emphasis on low temperature fuel cells

- Transportation Applications
- Distributed Generation (Building Applications)
- Hydrogen Technologies

Emphasis on high temperature fuel cells

- Large Stationary Applications
- Distributed Generation (Grid)



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The FreedomCAR Partnership



January 9, 2002
Secretary Abraham announces
the FreedomCAR Partnership

- **The CAR in FreedomCAR is Cooperative Automotive Research**
- **The Partners are:**
 - **U.S. Department of Energy**
 - **U.S. Council for Automotive Research**



Energy Security Through FreedomCAR Technology

America's Transportation Freedoms

- **Freedom from dependence on foreign petroleum**
- **Freedom from pollutant emissions**
- **Freedom to choose the vehicle you want**
- **Freedom to drive where you want, when you want**
- **Freedom to obtain fuel affordably and conveniently**



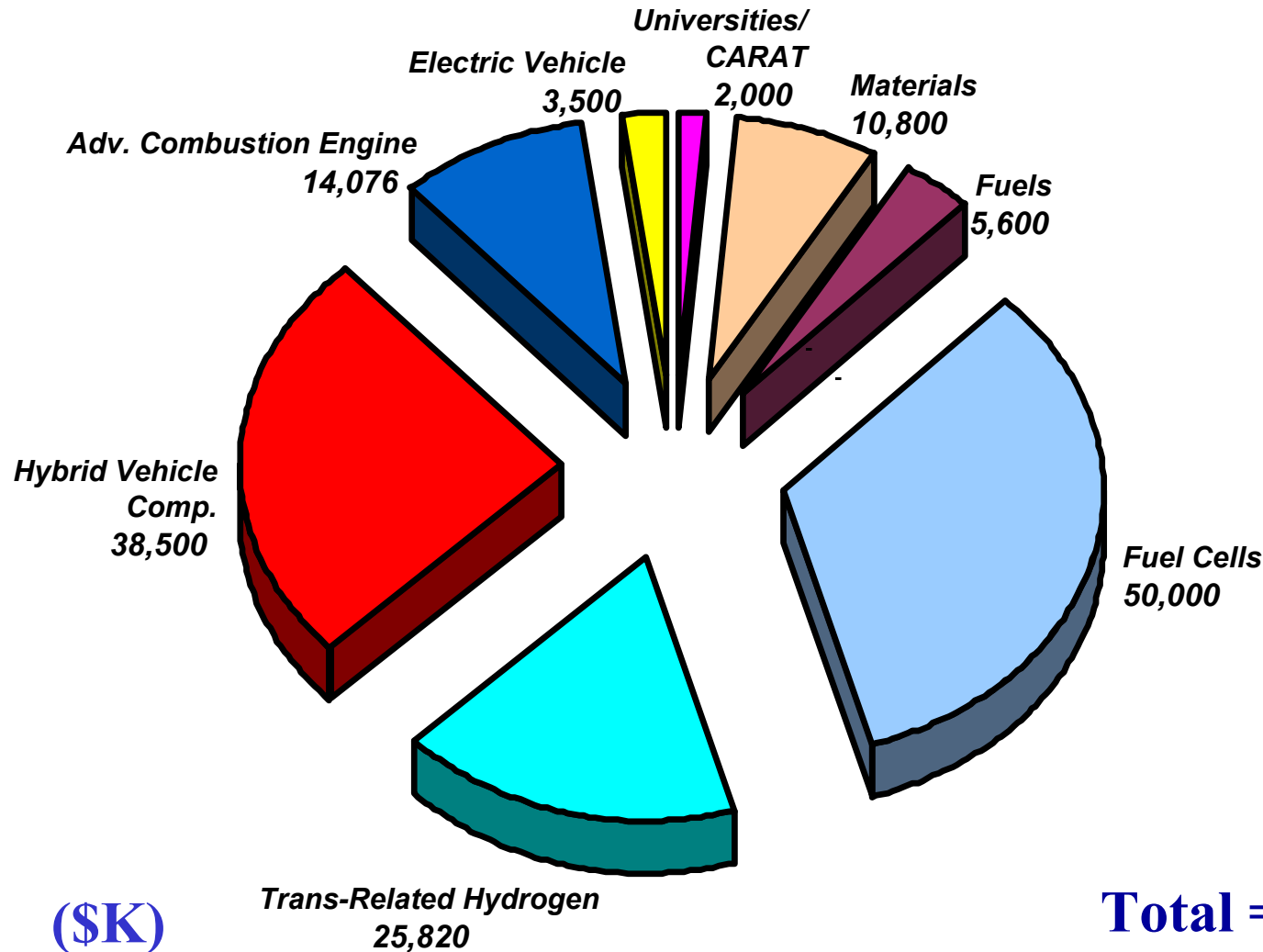
FreedomCAR Strategic Approach

- **Develop technologies to enable mass production of affordable hydrogen-powered fuel cell vehicles and assure the hydrogen infrastructure to support them.**
- **Continue support for hybrid technologies and advanced materials that can dramatically reduce oil consumption and environmental impacts in the nearer term.**
- **Develop technologies applicable across a wide range of passenger vehicles.**



FreedomCAR FY03 Budget

Request Reflects Fuel Cell and Hydrogen Priorities



(\$K)



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Fuel Cells and Hydrogen – The Critical Challenges

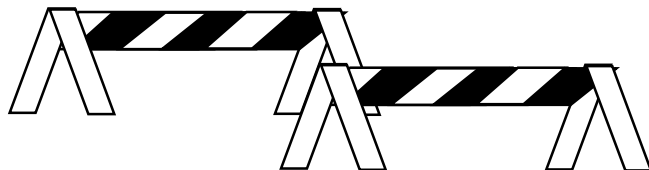
Fuel Cells:

- Cost (platinum)
- Durability
- Fuel Processing
- Air/Thermal/Water Management
- Codes & Standards



Hydrogen:

- Storage
- Fuel Infrastructure
- Hydrogen Fuel Cost
- Codes & Standards





EERE Fuel Cell and Hydrogen Funding (\$K)

Interior Appropriations				
TRANSPORTATION FUEL CELL R&D	FY 2001	FY 2002	FY 2003	Increase
Systems	7,405	7,600	7,600	0 (0%)
Components	12,052	12,825	14,900	2,075 (+16%)
Fuel Processing & Storage	20,806	21,300	24,100	2,800 (+13%)
Field Evaluations	0	0	3,000	3,000 (New)
Technical Support Services	400	200	400	200 (+100%)
TOTAL	40,663	41,925	50,000	8,075 (+19%)
DISTRIBUTED GENERATION TECH.				
TOTAL, Stationary Fuel Cells	5,440	5,500	7,500	2,000 (+36%)
Energy & Water Appropriations				
HYDROGEN RESEARCH				
Core Research and Development	14,438	14,426	19,331	4,905 (+34%)
Technology Validation	9,009	10,320	15,000	4,680 (+45%)
Analysis and Outreach	3,147	4,437	5,550	1,113 (+25%)
TOTAL	26,594	29,183	39,881	10,698 (+37%)



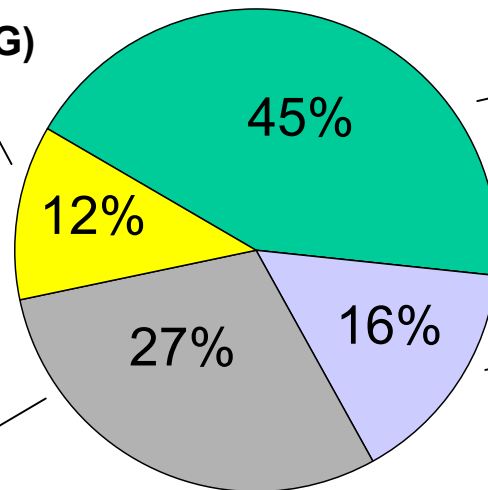
FY02 EERE Fuel Cell Activities (Interior)

Activities Focus on Removing High Risk Technical Barriers

FY 2002 Budget = \$47.425M

Distributed Generation (DG)

- Reforming Technology (NG)
- Critical Components
- Codes and Standards



Transportation Fuel Processing Subsystem

- On-Board Fuel Processor R&D
- gasoline, diesel, methanol

Transportation System

- Modeling/Validation
- Cost Analyses
- Ancillary Components
(Compressors, Sensors)

Transportation Fuel Cell Stack Subsystem

- Catalyst Loading Reduction
- MEA/Bipolar Plate Manufacturing
- Durability Studies



R&D is carried out by industry suppliers, national labs and universities.



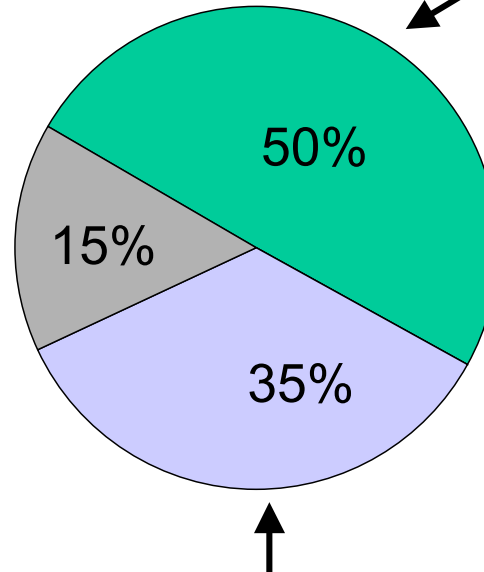
FY02 EERE Hydrogen Activities

(Energy and Water)

FY 2002 Budget = \$29.183M

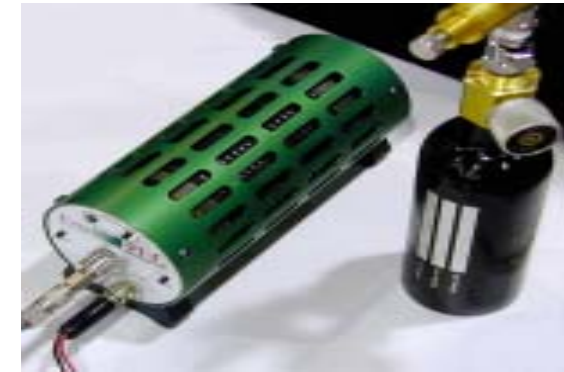
Analysis and Outreach

- Codes and Standards
- Educational Training
- Tank Standards



Core R&D

- Storage technology
- Hydrogen generation



Technology Validation

- Hydrogen refueling station demonstration
- Development of Power Parks concept



FY03 Hydrogen & Fuel Cell Program Activities

Transportation:

- Continuation of critical R&D through 30 new cost-shared industry contracts and national laboratories to address key barriers
- Field Evaluations - Emphasize the introduction and evaluation of fuel cell vehicles in fleets

Distributed Generation:

- Test laboratory natural gas fuel processor for PEM fuel cell systems
- Develop 50kW high temperature PEM system

Hydrogen Program:

- Increased efforts in hydrogen storage and infrastructure in support of the FreedomCAR program
- Support for Power Parks and Uninterruptible Power Sources



Report to Congress

FY02 Interior Appropriations Bill

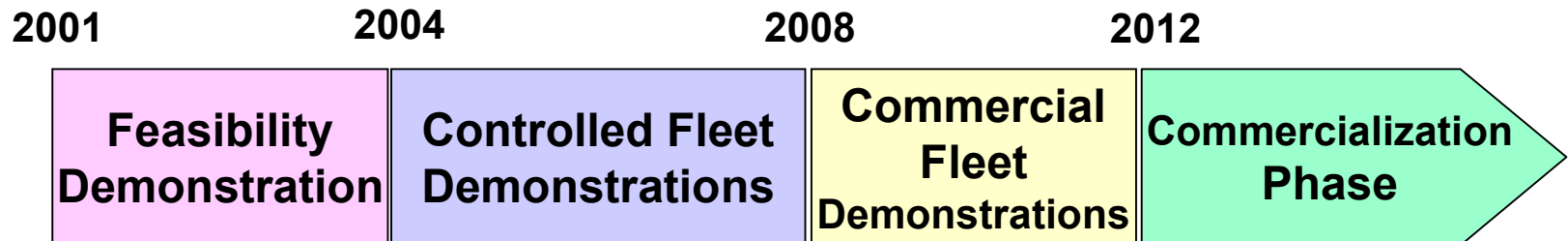
H.R. 2217, enacted November 5, 2001

Full Report: “Report... within twelve months... on the technical and economic barriers to the use of fuel cells. ...recommendations on program adjustments...needed for the commercial use of fuel cells ... by 2012.”

Interim Report: “Within six months...an interim assessment that describes the need for public and private cooperative programs to demonstrate the use of fuel cells.”

Preliminary Findings (Vehicles)

Potential Demonstration Program





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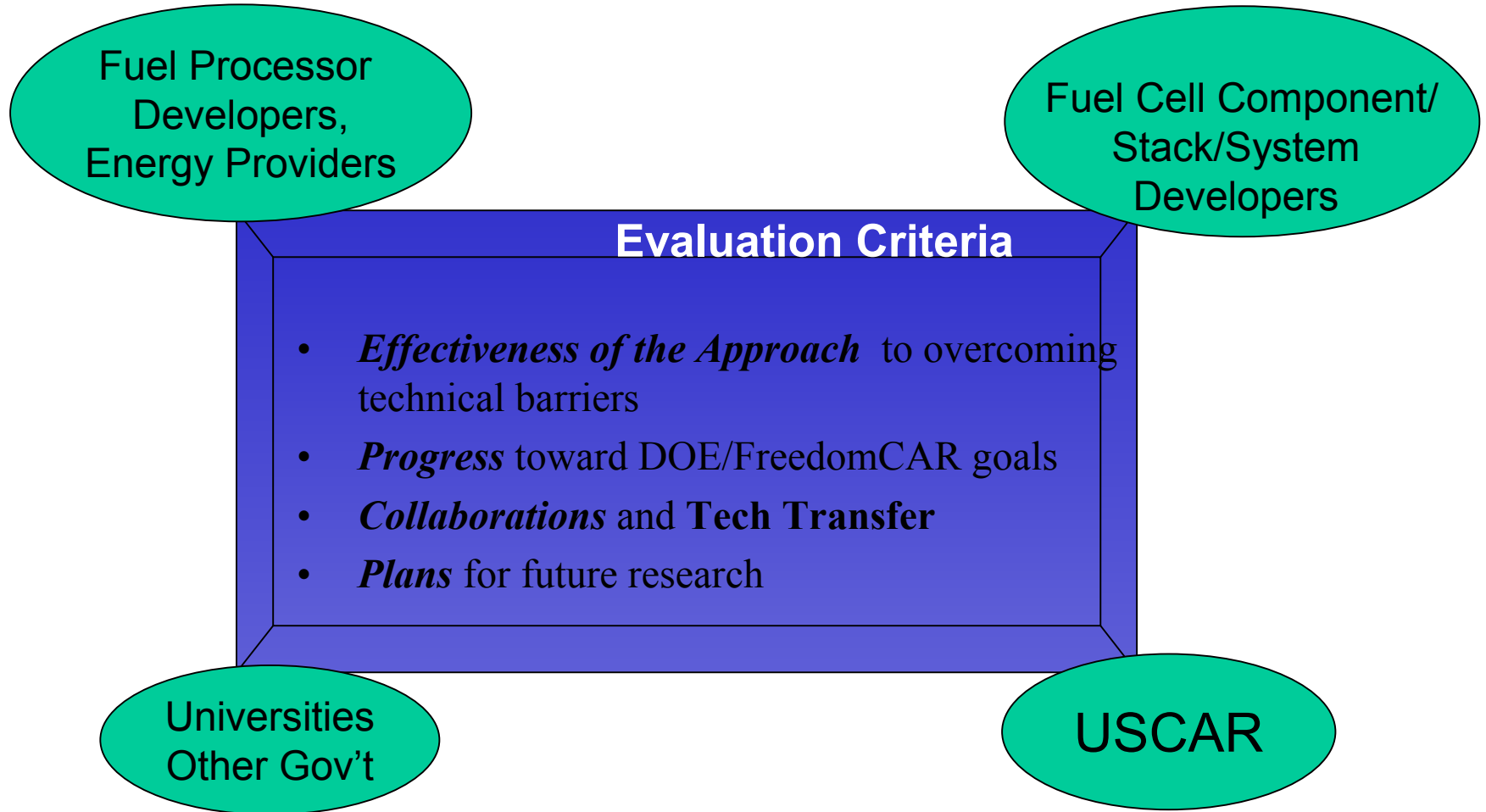
Meeting Objectives



- **Review progress/plans**
- **Foster industry/laboratory interactions, technology transfer**
- **Enhance National laboratory interactions**
- **Guide R&D priorities**



Advisory Panel/Evaluation Criteria





2001 Annual Progress Reports

Available at
[www.cartech.doe.gov](http://www.carttech.doe.gov)

